

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 164 599 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.12.2001 Bulletin 2001/51

(51) Int Cl.7: H01F 1/057

(21) Application number: 01305131.3

(22) Date of filing: 13.06.2001

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• Yamamoto, Kenji, c/o Magnetic Research Center
Takefu-shi, Fukui-ken (JP)
• Tatami, Koro, c/o Magnetic Research Center
Takefu-shi, Fukui-ken (JP)
• Minowa, Takehisa,
c/o Magnetic Research Center
Takefu-shi, Fukui-ken (JP)

(30) Priority: 13.06.2000 JP 2000176595

(71) Applicant: SHIN-ETSU CHEMICAL CO., LTD.
Chiyoda-ku Tokyo (JP)

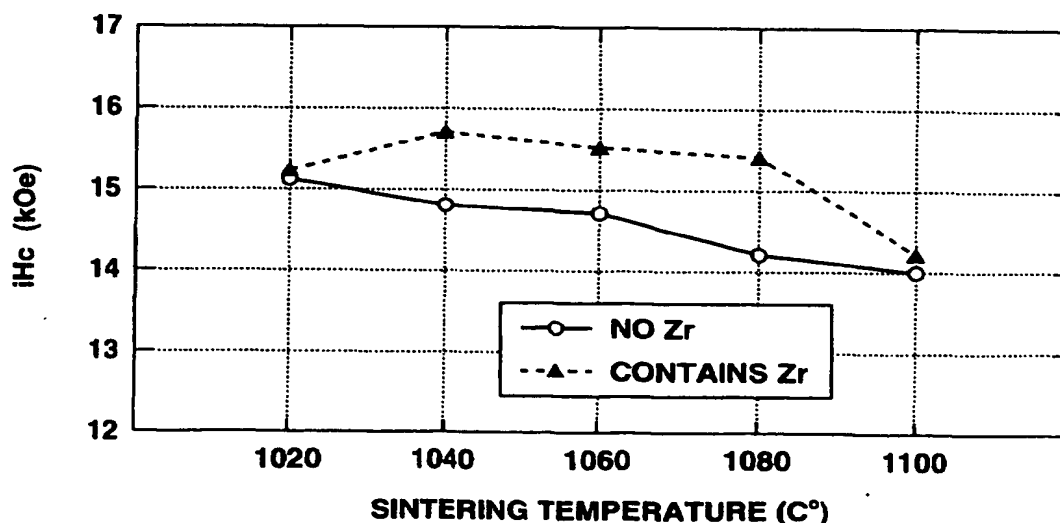
(74) Representative: Stoner, Gerard Patrick et al
MEWBURN ELLIS York House 23 Kingsway
London WC2B 6HP (GB)

(54) R-Fe-B base permanent magnet materials

(57) A R-Fe-B base permanent magnet material is composed of a R-Fe-B magnet alloy which contains 87.5-97.5 vol% of a $\text{Fe}_{14}\text{R}_2\text{B}_1$ primary phase and 0.1-3 vol% of a rare earth oxide or a rare earth and transition metal oxide. The alloy contains as a major component in its metal structure a compound selected from among zirconium-boron compounds, niobium-boron com-

pounds and hafnium-boron compounds. The compound has an average grain size of at most $5\text{ }\mu\text{m}$ and is uniformly distributed within the alloy such that the maximum interval between neighboring grains of the compound is at most $50\text{ }\mu\text{m}$. Rare-earth permanent magnet materials of this composition and structure have excellent magnetic properties.

FIG.2



EP 1 164 599 A2